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March 31, 2011

Ms. Kimberly Tisa
PCB Coordinator
U.S. Environmental Protection Agency Region 1
5 Post Office Square – Suite 100
Boston, Massachusetts 02109-3912

Re: PCB Remediation Plan
125 Western Avenue Building Renovation Project
Harvard University- Boston, Massachusetts

Dear Ms. Tisa:

On behalf of the President and Fellows of Harvard College (Harvard), please find attached a Remediation Plan prepared to comply with U.S. Environmental Protection Agency (EPA) requirements under 40 CFR 761.61 and 761.62.

The Harvard-owned building located at 125 Western Avenue in Boston, Massachusetts is undergoing major renovations in 2011. This Plan details the proposed remedial approach for polychlorinated biphenyl (PCB) bulk product waste (original caulking) and PCB remediation waste (impacted adjacent materials) that will be disturbed during the upcoming renovation work.

As we discussed during our phone conversation, at this time, the building renovation work is currently underway and on a fast-track completion schedule. Exterior caulking with PCBs ≥ 50 ppm was recently detected (February 2011) and the project team has been collecting data and developing this Remediation Plan. However, work is continuing and where this work encounters caulking ≥ 50 ppm, this material as well as any PCB impacted material generated in this work area, is being managed for disposal as a ≥ 50 ppm waste under 40 CFR 761.61(b).

If you have any comments, questions, or require further information, please do not hesitate to contact me at the number listed above.

Sincerely,

WOODARD & CURRAN INC.

Jeffrey Hamel, LSP, LEP
Senior Vice President

cc: T. Martin, Harvard
G. Reynolds, Harvard
MassDEP

PCB Remediation Plan

125 Western Avenue
Boston, Massachusetts

Project No. 223947

Harvard University

March 2011

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35 New England Business Center Suite 180
Andover, Massachusetts, 01810

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1. INTRODUCTION

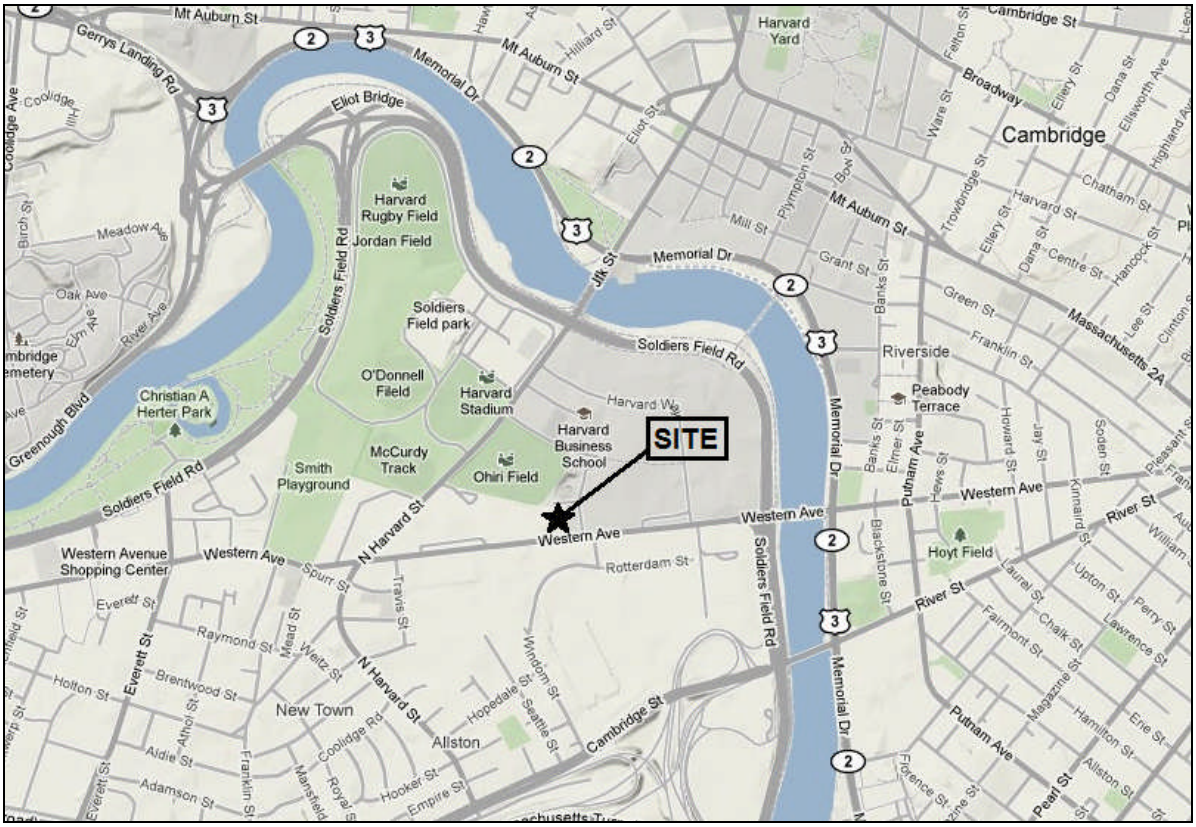
Woodard & Curran (W&C) has prepared this PCB Remediation Plan (Plan) on behalf of the President and Fellows of Harvard College (Harvard) to comply with U.S. Environmental Protection Agency (EPA) requirements under 40 CFR 761.61 and 761.62. The Harvard-owned building located at 125 Western Avenue in Boston, Massachusetts is undergoing major renovations in 2011. This Plan details the proposed remedial approach for polychlorinated biphenyl (PCB) bulk product waste (original caulking) and PCB remediation waste (impacted adjacent materials) that will be disturbed during the upcoming renovation work.

1.1 BACKGROUND

The building located at 125 Western Avenue in the Allston neighborhood of Boston was originally constructed in the early 1960's, and was used as the television and radio studio for the WGBH broadcasting network from August 1963 until September 2007. The one-story building is constructed primarily of concrete. Surrounding ground surfaces are generally flat in elevation and consist of asphalt pavement, concrete, or grass-covered soils.

The building is located on the northern side of Western Avenue at the southwest corner of the Harvard Business School campus, and southeast of Harvard's athletic fields. Photos of the building facades are provided at the end of this section. A Site Locus Map of the surrounding area is provided as Figure 1-1 below.

Figure 1: Site Locus Map



1.2 CONCEPTUAL SITE MODEL

Certain joint caulking used as part of standard construction practices for masonry buildings and concrete structures erected between the 1950's and late 1970's is known to have been manufactured with PCBs. PCBs were added to caulking for durability, resistance to degradation, and as a softener/plasticizer for application. Due to the porous nature of concrete and other masonry surfaces, PCBs in caulking may penetrate into adjacent materials during application or over time, may leach or weather, and/or may be disturbed during renovations or other work. Production and approved usage of PCBs was halted in the United States in the late 1970s. As indicated above, the building at 125 Western Avenue was constructed during this time period.

In preparation for the upcoming renovation project and based on the date of building construction, caulking materials were inspected and inventoried, and representative samples were collected for PCB analysis. Analytical results indicated that certain caulking materials contained PCBs at concentrations greater than 50 parts per million (ppm). Based on these results, adjacent building materials were sampled to determine whether PCBs had migrated from the caulking into these adjacent materials. Detectable concentrations of PCBs were reported in certain adjacent materials as presented in this plan.

Based on the concentration and distribution of PCBs detected in adjacent materials, it is apparent that the caulking used in the original construction was the source of PCBs. In general, concentration gradients identified in the adjacent materials demonstrate a reduction in total PCBs with increasing distance from caulked joints.

Under 40 CFR Part 761, caulking containing PCBs ≥ 50 ppm and select building materials coated or in direct contact with the caulking will be managed as a PCB Bulk Product Waste per 40 CFR 761.62 upon removal and disposal. Adjacent materials identified with PCBs within the renovation area will be managed as PCB Remediation Waste in accordance with 40 CFR 761.61.

1.3 PLAN ORGANIZATION

This Plan is organized into the following sections:

Section 2: Site Characterization

The site characterization section provides a summary of the characterization data that has been collected to date and presents the nature and extent of PCBs.

Section 3: Remediation Plan

The remediation plan section includes a discussion of the remedial objectives and cleanup levels, the remediation approach for each PCB-affected media, a sequence of activities, and a verification sampling plan. This plan has been prepared to satisfy the requirements of 40 CFR 761.61 for the remediation of PCB remediation wastes.

A written certification of this plan signed by the property owner is provided in Appendix A. The laboratory analytical data collected in support of this Plan is provided in Appendix B. A perimeter air monitoring plan to be implemented during select phases of the building remediation and renovation work is provided in Appendix C.

125 Western Ave – March 22, 2011
Western façade (left side of photo) and Southern façade (right side of photo)

125 Western Ave – March 22, 2011
Eastern façade (left side of photo) and Northern façade (right side of photo)

2. SITE CHARACTERIZATION

In February and March 2011, a total of 72 primary samples were collected for PCB analysis from caulking and adjacent materials at representative locations, including 24 bulk caulking samples and 48 bulk concrete samples. Analytical data summary tables are provided as Table 2-1 (Caulking Analytical Data Summary) and Table 2-2 (Adjacent Concrete Analytical Data Summary). In addition to the primary samples outlined above, two field duplicate samples and one aqueous field equipment blank sample were collected for quality control purposes.

2.1 SAMPLE COLLECTION AND ANALYSIS METHODS

Sampling methods particular to each sample media collected for laboratory analysis in support of this plan are described below.

- Caulking samples were collected by cutting and scraping the caulking from the joint with hand tools. If adjacent media (e.g., concrete or a foam backer rod) was inadvertently removed in the process of sample collection, this media was physically removed from the caulking before the appropriate volume of the sample media was placed in its sample container.

- Concrete sampling was conducted in general accordance with the USEPA Region I *Draft Standard Operating Procedure for Sampling Concrete in the Field* (December 1997) using a hammer drill. Holes were made into the concrete to a depth of 0.5 inches and spanned a length necessary to achieve the required sample volume. After the holes were made, the bulk material was scooped from the surface using hand tools and placed in the appropriate sample containers.

Samples were logged on standard Chain-of-Custody forms and stored on ice for delivery to the laboratory. Samples collected by Woodard & Curran were analyzed by Analytics Environmental Laboratory of Portsmouth, New Hampshire or Contest Analytical Laboratory of East Longmeadow, Massachusetts; samples collected by Environmental Health, Inc. (EHI) were analyzed by GeoLabs, Inc. of Braintree, Massachusetts. At each laboratory, samples were extracted using USEPA Method 3540C (Soxhlet Extraction) and analyzed for PCBs using USEPA Method 8082. The complete laboratory analytical reports for the characterization data are provided in Appendix B of this plan.

Reusable sampling equipment was decontaminated prior to use and between each sample location using an initial gross removal to remove any visible material or debris followed by a detergent scrub, a distilled or de-ionized water rinse, and a final wipe down.

2.2 SITE CHARACTERIZATION RESULTS

For each building face subject to renovation work, the results of the characterization sampling are presented in the following sections by sample media and location. In addition, the existing conditions of each façade as well as the characterization sample locations and proposed renovation plans are depicted on Figure 2 (South Façade Elevation), Figure 3 (East Façade Elevation), Figure 4 (West Façade Elevation), and Figure 5 (North and Partial West Façade Elevations).

2.2.1 South Façade Elevation

On the south façade elevation, caulking or other sealant materials were typically observed at select window glass to metal joints (e.g., glazing sealant on a glass window pane within a metal frame), metal to concrete joints (e.g.,

caulking between a metal window frame and the adjacent concrete wall), and concrete to concrete joints (e.g., caulking between concrete masonry unit [CMU] block and structural concrete).

As described further in Section 3 of this Plan, the scope of renovation work for this elevation includes select window removal, CMU block removal, CMU block cleaning and painting, concrete pad/curb removal, and a limited soil excavation. Results of the building material characterization samples collected in support of this renovation scope are discussed below; sample locations are depicted on Figure 2.

Caulking and Sealants

Representative samples were collected from each material observed within the scheduled work area. The results of these samples are summarized below:

- Glass to metal glazing sealant results ranged from 2.48 to 32.4 ppm in interior glazing (4 samples) and were reported at 0.716 ppm in one exterior glazing sealant sample. The exterior glazing sealant sample was collected from the same window where an interior glazing sealant sample was reported with PCBs > 1 ppm (2.48 ppm). This set of glazing sealant data is considered unique to the windows observed on this façade and was not applied to any other building façade.

- One metal to concrete caulking result was reported as non-detect for PCBs (<0.360 ppm) at the perimeter of a metal vent cover outside a first floor mechanical room. A visually similar light gray caulking was observed at several other metal vent covers on other building façades, and this result was also applied to those locations.

- Ground floor windows were reported with PCBs ≥ 50 ppm at a metal to concrete joint (19,300 ppm) and with PCBs > 1 and < 50 ppm at a metal joint beneath a concrete overhang (1.90 ppm) over the same window bank. Second and third floor windows were also reported with PCBs ≥ 50 ppm at the metal to concrete perimeter joint (1,470 ppm). This set of data is considered unique to the construction observed on this façade and was not applied to any other building façade.

- Front lobby window/door components were sampled and reported with PCBs ≥ 50 ppm at metal to concrete joints (4 results ranging from 269 to 110,000 ppm). This set of data is considered unique to the construction observed on this façade and was not applied to any other building façade.

- Concrete to concrete caulking results were reported with PCBs ≥ 50 ppm at both joint types observed on this façade, including one CMU to concrete column sample (1,070 ppm) and one concrete curb to curb joint (1,860 ppm). The CMU to concrete caulking sampled on this façade was visually similar to the CMU to concrete caulking also observed and sampled on other façades.

Adjacent Materials

Representative samples were collected on the south façade elevation from CMU and structural concrete within the scheduled work area. The results of these samples are summarized below:

- CMU block above a horizontal caulked joint (structural concrete below CMU) – 1 sample. The result was reported with PCBs at 0.23 ppm at a distance of 8-9 inches above the joint (beyond first full block height).

- CMU block below a horizontal caulked joint (structural concrete above CMU) – 2 samples. PCBs reported at 0.406 ppm at a distance of 8-9 inches below the joint (below one full block height), and at 0.293 ppm at a distance of 16-17 inches below the joint (below two full block heights).

- CMU block beside a vertical caulked joint (structural concrete beside CMU) – 1 sample. PCBs reported at 7.64 ppm at a distance of 0-1 inches from the joint (adjacent to caulking).

- CMU block beside a vertical caulked joint (metal frame beside CMU) – 3 samples. PCBs reported at 4.68 and 6.74 ppm at a distance of 0-1 inches from the joint (adjacent to caulking), and at 0.41 ppm from the CMU block between two windows at a distance of 6.5 inches from a building corner.

- Structural concrete below a horizontal caulked joint (metal frame above structural concrete) – 3 samples. PCBs reported at 12.2 ppm at a distance of 0-1 inches from the joint (adjacent to caulking), and at 0.741 ppm at a distance of 5-6 inches from the joint. At a separate location with a different caulking type, PCBs were reported at 0.319 ppm at a distance of 0-1 inches from the window joint (adjacent to caulking).

- Structural concrete beside a vertical caulked joint (CMU beside structural concrete) – 2 samples. PCBs reported at 2.49 ppm at a distance of 0-1 inches from the joint (adjacent to caulking), and < 0.033 ppm at 5-6 inches from the joint.

- Structural concrete beside a vertical caulked joint (metal beside structural concrete) – 2 samples. PCBs reported at 1.94 ppm at a distance of 0-1 inches from the joint (adjacent to caulking), and 0.084 ppm at 5-6 inches from the joint.

2.2.2 East Façade Elevation

On the east façade elevation, caulking or other sealant materials were typically observed at select metal to concrete joints (e.g., caulking between a metal window frame and the adjacent concrete wall), and concrete to concrete joints (e.g., caulking between CMU block and structural concrete).

As described further in Section 3 of this Plan, the scope of renovation work for this elevation includes select window removal, CMU block and concrete panel removal, CMU block cleaning and painting, and asphalt and soil removal. Results of the building material characterization samples collected in support of this renovation scope are discussed below; sample locations are depicted on Figure 3.

Caulking

Representative samples were collected from each material observed within the scheduled work area. The results of these samples are summarized below:

- Two types of metal to concrete caulking were observed on this elevation. For the first floor window caulking at metal to concrete, results were reported with PCBs < 1 ppm at a similar metal window joint on the north façade elevation (0.878 ppm). For the two emergency exit doors at the northern end of the elevation (2nd and 3rd floors), results were reported with PCBs > 1 and < 50 ppm at the metal to concrete perimeter joint (3.72 ppm).

- The concrete to concrete caulking result was reported with PCBs ≥ 50 ppm at the single joint type observed and sampled on this façade; a result of 3,600 ppm was reported for a CMU to structural concrete sample between the 2nd and 3rd floors. The CMU to concrete caulking sampled on this façade was visually similar to the CMU to concrete caulking also observed and sampled on other façades.

Adjacent Materials

Representative samples were collected on the east façade elevation from CMU and structural concrete within the scheduled work area. The results of these samples are summarized below:

- CMU block above a horizontal caulked joint (structural concrete below CMU) – 1 sample. The result was reported with PCBs at 8.65 ppm at a distance of 0-1 inches above the joint (adjacent to caulking).

- CMU block below a horizontal caulked joint (structural concrete above CMU) – 2 samples. Both samples were reported as non-detect for PCBs as PCBs were not detected above the laboratory's minimum reporting limits (< 0.033 ppm). These samples were collected at distances of 8-9 inches below the joint (beyond one full block width) and at 16-17 inches below the joint (beyond two full block widths).

- CMU block beside a vertical caulked joint (structural concrete beside CMU) – 2 samples. PCBs reported at 0.215 ppm at a distance of 16.5 inches from the joint (the first accessible half-block after a recess adjacent to the caulked joint), and as non-detect (PCBs < 0.033 ppm) at a distance of 24 inches from the joint (the first accessible full block after a recess adjacent to the caulked joint).

- CMU within the perimeter of a scheduled CMU removal area – 16 samples collected on a 5-foot grid in support of a "cut-line" approach for segregation and disposal under 40 CFR 761.61(b). All 16 samples were reported as non-detect for PCBs (various reporting limits ranging from 0.091 to 0.100 ppm) at a distance of 8-9 inches from the caulked joints (i.e., the proposed cut line in the nearest mortar joint beyond caulking).

- Structural concrete above a horizontal caulked joint (CMU below structural concrete) – 2 samples. PCBs reported at 0.281 ppm at a distance of 0-1 inches from the joint (adjacent to caulking on the underside of an overhang), and as non-detect (PCBs < 0.033 ppm) at a distance of 3.5-4 inches from the joint (beyond a 90-degree corner to a vertical face).

- Structural concrete below a horizontal caulked joint (CMU above structural concrete) – 1 sample. PCBs reported at 1.47 ppm at a distance of 0-1 inches below the joint (adjacent to caulking) on a flush building face.

- Structural concrete beside a vertical caulked joint (CMU beside structural concrete) – 2 samples. PCBs reported at 0.098 ppm at a distance of 4-5 inches from the joint (before a 90-degree corner), and at 0.113 ppm at 6.5-7.5 inches from the joint (after a 90-degree corner).

2.2.3 West Façade Elevation

On the west façade elevation, caulking or other sealant materials were typically observed at select metal to concrete joints (e.g., caulking between a metal window frame and the adjacent concrete wall), and concrete to concrete joints (e.g., caulking between CMU block and structural concrete).

As described further in Section 3 of this Plan, the scope of renovation work for this elevation includes select window removal, CMU block removal, CMU block cleaning and painting, and a limited soil removal. Results of the building material characterization samples collected in support of this renovation scope are discussed below; sample locations are depicted on Figure 4.

Caulking

Representative samples were collected from each material observed within the scheduled work area. The results of these samples are summarized below:

- Metal to concrete caulking results were reported with PCBs > 1 and < 50 ppm at an exterior third floor metal window joint scheduled for removal (2.24 ppm), and with PCBs ≥ 50 ppm at the exterior joint at the same window (53.8 ppm). A second type of interior caulking was reported with PCBs at 1.41 ppm at this window

bank. A metal vent perimeter caulking was observed to be the same material present at the vent perimeter on the south façade, which was reported as non-detect for PCBs (< 0.36 ppm).

- The concrete to concrete caulking result was reported with PCBs ≥ 50 ppm at the single joint type observed and sampled on this façade; a result of 1,570 ppm was reported for a CMU to CMU sample on the second floor. This material was visually similar to the CMU to concrete caulking also observed and sampled on other façades.

Adjacent Materials

Representative samples were collected on the west façade elevation from CMU and structural concrete within the scheduled work area. The results of these samples are summarized below:

- CMU block below a horizontal caulked joint (structural concrete above CMU) – 2 samples. PCBs reported at 0.186 ppm at a distance of 9-10 inches below the joint (below one full block height), and at < 0.04 ppm at a distance of 17-18 inches below the joint (below two full block heights)
- CMU block beside a vertical caulked joint (structural concrete beside CMU) – 2 samples. PCBs reported at 0.100 ppm at a distance of 5-6 inches from the joint (the first accessible half-block after a recess adjacent to the caulked joint), and as non-detect (PCBs < 0.033 ppm) at a distance of 11.5-12.5 inches from the joint (the first accessible full block after a recess adjacent to the caulked joint).
- Structural concrete above a horizontal caulked joint (CMU below structural concrete) – 2 samples. PCBs reported at 3.21 ppm at a distance of 0-1 inches from the joint (adjacent to caulking on the underside of an overhang), and at 0.385 ppm at a distance of 3.5-4 inches from the joint (beyond a 90-degree corner to a vertical face).
- Structural concrete beside a vertical caulked joint (CMU beside structural concrete) – 2 samples. PCBs reported as non-detect for PCBs (< 0.033 ppm) at 4-5 inches from a joint (before a 90-degree corner) and at 6.5-7.5 inches from the joint (after a 90-degree corner).

2.2.4 North Façade Elevation

On the north façade elevation, caulking was typically observed at select concrete to concrete joints between CMU block and structural concrete. The caulking material was visually similar to the CMU to concrete caulking also observed and sampled on other façades (PCBs in caulking ≥ 50 ppm). In addition, one sample collected by others was reported with PCBs at 1,060 ppm in the CMU to concrete caulking, and a sample of the caulking at the window perimeters on this façade (metal to concrete) was reported with PCBs at 0.878 ppm.

As described further in Section 3 of this Plan, the scope of renovation work for this elevation includes select CMU block cleaning. Because no concrete samples were collected from this façade, the results of the building material characterization samples collected from similar joint types at other façades have been used to develop the remedial approach for the north elevation. The existing conditions and renovation plans for the north façade elevation are depicted on Figure 5.

2.2.5 Partial West Façade Elevations – North and South

As described further in Section 3 of this Plan, the scope of renovation work for this elevation includes select CMU block cleaning (partial west – north) and installing new metal panel siding (partial west – south).

In general, caulking was observed at concrete to concrete joints between CMU block and structural concrete. While no samples were collected from these façades, the caulking material was visually similar to the CMU to concrete caulking also observed and sampled on other façades (PCBs ≥ 50 ppm). In addition, a metal vent perimeter caulking was observed to be the same material present at the vent perimeter on the south façade, which was reported as non-detect for PCBs (< 0.36 ppm).

Because no caulking or concrete samples were collected from these partial elevations, the results of the building material characterization samples collected from similar joint types at other façades have been used to develop the remedial approach for the partial west elevations. The existing conditions and renovation plans for the partial west elevations are depicted on Figure 5.

2.2.6 Building Material Characterization Summary

The set of characterization data presented in this section was evaluated collectively to develop the following conceptual site model:

- **Caulking**
    - **PCBs ≥ 50 ppm:** Concrete to concrete façade caulking was sampled at four locations with concentrations ranging from 1,060 to 3,600 ppm. Any visually similar caulking materials at other concrete to concrete joint locations on the building exterior have been assumed to fall into this category for characterization purposes.
    - **PCBs ≥ 50 ppm:** Concrete to metal window frame caulking (various types) were reported with PCBs ≥ 50 ppm at the south façade 1st floor windows, the south façade 2nd & 3rd floor windows, the south façade lobby windows, and the west façade 3rd floor windows. At each of these locations, additional sealants (e.g., window pane glazing sealant) were sampled and reported with PCBs > 1 and < 50 ppm; however, where the windows are scheduled for removal and off-site disposal, the higher concentration (PCBs ≥ 50 ppm) will dictate the remediation & disposal approach.
    - **PCBs ≥ 50 ppm:** One concrete to concrete curb caulking was sampled and reported with PCBs at 1,860 ppm.
    - **PCBs > 1 and < 50 ppm:** One caulking sample collected from the east elevation fire escape doors (unique to this elevation) was reported with PCBs at 3.72 ppm.
    - **PCBs ≤ 1 ppm:** One caulking sample collected from the north elevation windows was reported with PCBs at 0.878 ppm; this caulking was also observed on the first floor east elevation windows; the metal vent cover caulking (multiple elevations) was reported with PCBs below laboratory reporting limits (<0.360 ppm).
- **Adjacent Concrete (CMU)**
    - **PCBs ≥ 50 ppm:** none
    - **PCBs > 1 and < 50 ppm:** CMU block was sampled from four locations within 0-1 inch intervals from caulked joints; all four of these results were reported with PCBs > 1 and < 50 ppm, with concentrations ranging from 4.68 to 8.65 ppm.

- **PCBs ≤ 1 ppm:** CMU block sampled from 27 locations at distances ranging from 5 to 24 inches beyond caulked joints were reported with PCBs ≤ 1 ppm at all 27 locations, with 21 of these samples reported as non-detect for PCBs.

- **Adjacent Concrete (Structural)**
  - **PCBs ≥ 50 ppm:** none
  - **PCBs > 1 and < 50 ppm:** Structural concrete was sampled from seven locations within 0-1 inch intervals from caulked joints; five of these results were reported with PCBs > 1 and < 50 ppm, with concentrations ranging from 1.47 to 12.2 ppm.
  - **PCBs ≤ 1 ppm:** Structural concrete was sampled from seven locations within 0-1 inch intervals from caulked joints; two of these results were reported with PCBs ≤ 1 ppm, with concentrations ranging from 0.281 to 0.319 ppm. Structural concrete sampled from nine locations at distances ranging from 3.5 to 7.5 inches beyond caulked joints were reported with PCBs ≤ 1 ppm at all nine locations, with four of these samples reported as non-detect for PCBs.

2.3 ADJACENT GROUND SURFACES

Based on the results of the exterior caulking samples, the potential exists for PCBs to have migrated to adjacent ground surfaces (grass-covered soils and/or paved surfaces). Characterization samples from adjacent soils have been collected for laboratory analysis of PCBs; however, these results have not been received from the laboratory, as of the date of this plan. If needed, it is anticipated that a modification to this Plan for subsequent EPA Approval will be completed for ground surfaces adjacent to the building after the characterization of these surfaces has been completed.

2.4 DATA USABILITY ASSESSMENT

A data quality assessment was conducted by a third-party validator (Data Check Inc. of New Durham, New Hampshire for caulking samples) and by Woodard & Curran to evaluate the usability of the site characterization data. Results for samples submitted to Analytics and Contest laboratories were validated by a review of sample custody, holding times, surrogates, method blanks, field blanks, matrix spike/matrix spike duplicates, laboratory control samples, laboratory and field duplicates, and field equipment blanks. The assessment was performed in general conformance with USEPA Region I Guidelines and the Quality Control Guidelines.

Some samples were analyzed at dilutions due to the high concentration of PCBs present in the samples and/or due to sample matrix. Elevated quantitation limits are reported in these samples as a result of the dilutions performed.

Two pairs of duplicate samples were collected and submitted to the laboratory as part of the field QA/QC procedures. The results of one primary concrete sample collected during the concrete sampling event (125-CBC-059; 0.186 ppm) had acceptable precision in comparison to its associated duplicate sample (125-CBCD-060; 0.201 ppm), signifying acceptable data precision as the relative percent difference (RPD) between the samples (7.8%) was within the limits allowed by data acceptance criteria. For the primary and duplicate samples submitted during the caulking sampling event, Aroclor 1248 results in samples 125-CBK-032 and 125-CBKD-033 were reported with an RPD above acceptance criteria (51.7%) and have been qualified as estimated (J).

The relative percent difference between the column results for all detected PCBs met acceptance criteria (≤ 25%) with the following exceptions: 125-CBK-024, 125-CBK-030, 125-CBK-036, 125-CBC-045, 125-CBC-057, 125-CBC-

062, 125-CBC-071, and 125-CBC-077. These results were qualified as estimated (J). Column results were not provided for the samples analyzed by Contest.

Accuracy of the analytical data was assessed by reviewing recoveries for surrogates, laboratory control samples (LCS), and laboratory control sample duplicates (LCSD). All surrogate recoveries met acceptance criteria or were diluted out except as noted on the caulking data validation summary. The LCS and LCSD met acceptance criteria. No qualifications were applied to the data.

Representativeness of the data was evaluated utilizing site use information and sampling data. All samples were extracted and analyzed within allowable holding times. Consistent procedures and laboratory analysis of the data were achieved. Sample containers were packed on ice and were accompanied by complete chain of custody forms from the time of sample collection until laboratory delivery. PCBs were not detected in the laboratory method blank analysis, indicating that there were no interferences introduced at the laboratory during sample analysis. PCBs were not detected in either of the two aqueous field blank samples collected during concrete sampling events, indicating that there were no interferences introduced in the field due to the sampling methods.

The data packages were reviewed to ensure that all sample and associated quality assurance results were available. The completeness review indicated that all samples were analyzed and all quality control results were available to complete the data validation process.

Based on a review of the existing site data, the data adequately represents the materials tested, and the samples collected to date are considered usable for the purposes of characterizing PCB-affected media in accordance with 40 CFR Part 761.

3. REMEDIATION PLAN

The remediation plan proposed herein has been prepared to meet the requirements of 40 CFR 761.61(a) and 40 CFR 761.61(c). Caulking containing PCBs ≥ 50 ppm will be removed for off-site disposal in accordance with 40 CFR 761.62, and adjacent building materials containing PCBs > 1 ppm will be removed for off-site disposal in accordance with 40 CFR 761.61(a) or managed in place in accordance with 40 CFR 761.61(c); in some instances, certain materials will be managed for off-site disposal in accordance with 40 CFR 761.61(b) as required by the project schedule. Materials scheduled for off-site disposal under 40 CFR 761.61(a) will be segregated based on the classification of the materials as PCBs ≥ 50 ppm, PCBs > 1 and < 50 ppm, or general demolition debris; materials scheduled for off-site disposal under 40 CFR 761.61(b) will be managed as PCBs ≥ 50 ppm.

This section includes details of the site preparations and controls, proposed remediation activities for each media, verification approach, waste storage and disposal plans, and recordkeeping requirements.

3.1 REMEDY OVERVIEW

The scope of renovation work that has the potential to disturb PCB-containing caulking and/or adjacent materials identified in Section 2 includes select window removal, CMU block removal, CMU block cleaning and painting, concrete pad/curb removal, and asphalt and soil removals. Because the earthwork is scheduled to occur later in the project and the timeframe to complete the building work is on a more accelerated schedule, this Plan presents the remedial approach for materials associated with the building façade only, and includes:

- Site Preparation and Controls (Section 3.2)
- Caulking and CMU Scheduled for Removal (Section 3.3)
- Caulking and Windows Scheduled for Removal (Section 3.4)
- Caulking and Building Materials in Areas Scheduled to Remain in Place (Section 3.5)
- Ground Surface Coverings and Soil (Section 3.6)

For those materials that will not be removed and will remain in place on the building, a high occupancy use cleanup level has been used for areas on the 1st floor or within 10 feet of the planned finished ground surface. For areas greater than 10 feet of ground surface (upper 2nd and 3rd floors), the low occupancy cleanup criteria of 25 ppm will be applied given that access to this area will be extremely limited and this area meets the low occupancy use definition. As part of the use of the low-occupancy criteria, a deed notice will be prepared for the building after remediation work is completed.

Drawings depicting the façade renovation plans relevant to the PCB remediation component of work are provided as Figure 2 (South Façade Elevation), Figure 3 (East Façade Elevation), Figure 4 (West Façade Elevation), Figure 5 (North and Partial West Façade Elevations).

3.2 SITE PREPARATION AND CONTROLS

Prior to initiating remedial activities, the following site controls will be implemented:

- A Health & Safety Plan will be developed specific to the work activities. Workers will follow applicable Federal and State regulations regarding the work activities, including but not limited to OSHA regulations, fall protection standards, respiratory protection, ladder/scaffolding safety, personal protective equipment, etc.;
- Additional notifications and plans required for the work activities will be prepared and submitted for approval, as needed (EPA Approval notices and submittals, certifications, etc.);
- There are no occupants to the building at this time and the property is an active construction site. Access to the property is controlled via fence and all visitors must sign in to the construction trailer. Access to the active work areas will be controlled in a manner determined by the contractor to meet project requirements and access needs;
- Access to the removal areas will be by appropriate staging, scaffolding, and/or mechanical lifts. Caulking and masonry removal areas will be contained using polyethylene sheeting or equivalent to control any dust or debris generated from the removal activities. Wet wiping and water misting will be used as a dust suppressant as appropriate;
- Ground cover (poly sheeting, water impervious membrane, or equivalent) will be placed along the building walls to contain any debris or building materials removed during the work;
- Powered tools will be equipped with appropriate tool guards and dust/debris collection systems, as needed (i.e., HEPA filters). Wet wiping and vacuuming of tools and equipment in the work area will be performed at the completion of the work activity;
- To reduce dust levels and exposures to dust, a combination of engineered controls (e.g., work zone enclosures, water misting), equipment equipped with HEPA filters and dust controls, and personal protective equipment (PPE – respirators) will be implemented as part of the work activities;
- Perimeter dust monitoring will be performed to monitor total particulate dust in the perimeter to the active work zone (in the support zone) during active concrete and soil removal activities as described in the perimeter air monitoring plan (Appendix C);
- At the end of each work day any debris or materials collected on the ground cover sheeting will be placed in the appropriate waste containers; and
- Following completion of the removal activities and verification that the cleanup levels have been met, site controls specific to the PCB disposal portion of the renovation will be dismantled. Containment materials will be transported off-site for proper disposal as per Section 3.7.

3.3 REMEDIAL APPROACH: CAULKING AND CMU SCHEDULED FOR REMOVAL

As depicted on Figures 2, 3 and 4, thirteen exterior CMU wall sections are scheduled for removal and off-site disposal as part of this renovation work. The caulking present at masonry joints around these CMU wall sections contain PCBs ≥ 50 ppm, and the CMU at locations in direct contact with and nearest to the caulked joints contains PCB at concentrations > 1 ppm. According to the Contractor, the removal of CMU blocks is the first component of

the exterior work and is integral to the overall schedule for the installation of new structural components to the building to allow for new interior flooring. Given this schedule, some of these areas are proposed to be conducted under 40 CFR 761(b) approach for the disposal of the material because the additional disposal costs do not outweigh the impacts to the schedule and subsequent phases.

Management of the removed CMU walls for disposal will be performed in either of two manners, depending on the timing of EPA's Approval of this Plan. In either case, the work methods are the same in both scenarios and will consist of:

- Site controls will be established before removal work as described in Section 3.2.
- Prior to CMU demolition, gross removal of exterior caulking will be performed using hand tools and mechanical caulking cutters to the maximum extent practical. 6-mil poly will be laid on the ground to a distance of at least 10' from the building underneath the work area to collect any falling debris and the aerial lift booms will be contained in polyethylene sheeting. It is estimated that approximately 875 linear feet of caulking fall into this category.
- As part of the remedial design, two options were evaluated with regard to removal and segregation techniques for the CMU block. Based on the characterization testing, PCB impacts > 1 ppm were not observed beyond the first mortar joint (between 5 and 8 inches from the caulked joint). One option evaluated a saw-cut approach where the CMU would be saw cut at 8 inches from the joint and segregated for disposal and the second option was simultaneous removal of all CMU block. Based on this evaluation, it was determined that the saw cut method was more labor intensive and expensive when compared to the whole block panel method and did not offer a comfort level that block within the cut line (PCB area) would not "fall" into and become mixed with the other non-PCB CMU block. Given these findings, the project team has selected the whole block panel removal method with two disposal options for the CMU materials as indicated below (NOTE: as indicated above, all caulking will be removed as a separate task, prior to any block wall demolition).
- CMU walls will be demolished by pushing the block into the building using an excavator with a high reach boom. Prior to any CMU demo, both interior and exterior containments/controls will be installed to control any spread of dust or debris outside of the work areas.
- CMU block will then be loaded into covered and lined roll-off containers using either a bobcat (1st floor areas) or via dust-controlled chutes (upper floors).
- A discussion of the disposal options for the CMU block is presented in the following sub-sections.
- Following block demolition, any residual PCB caulking from the remaining structural concrete present at the outer perimeter of the former CMU wall section will be scraped and removed for disposal as ≥ 50 ppm PCB wastes. Wetting of materials during scraping will be performed in a controlled manner.
- Based on the characterization data collected to date and experience at previous buildings, it is assumed that the structural concrete columns in the area of the former caulked joint will contain residual concentrations of PCBs. Given that this material cannot be removed for structural reasons, the remedial plan is to encapsulate the concrete with a liquid epoxy, such as Sikagard 62, or equivalent in the former area of the joint. As discussed in subsequent sections, the extent of encapsulation will be dependent on the location of the structural concrete in relation to the building elevation. For areas within 10 feet of ground surface, the liquid coating will be applied to the former caulked joint location and extend a minimum of 3.5 inches away from the former joint – area where PCBs were < 1 ppm (see Section 2). For areas greater than 10 feet

above ground surface (upper 2nd and 3rd floors), the low occupancy cleanup criteria of 25 ppm will be applied given that access to this area will be extremely limited and this area meets the low occupancy use definition. In these areas, the liquid coating will only be applied to the former caulked joint location since all other samples were < 25 ppm (see Section 2).

- No baseline concrete samples are proposed from these structural columns given their structural nature and limited access (refer to Section 3.5.1 for baseline sampling to be conducted in other former direct contact areas). After coating application, wipe samples will be collected in accordance with 40 CFR 761.123 at a frequency of 1 sample per 100 linear feet. Samples will be transported to the laboratory under standard chain of custody procedures, extracted by USEPA Method 3540C (Soxhlet extraction), and analyzed for PCBs by USEPA Method 8082. Analytical results from the wipe samples will be evaluated to determine whether or not this task is complete as follows:

    - Analytical results ≤ 1 µg/100 cm^2 – task complete; no additional coating required.

    - Analytical results > 1 µg/100 cm^2 – additional coating of epoxy may be applied, and follow-up verification wipe sample to be collected at an off-set location. In select areas, review of subsequent new construction materials to be installed over the liquid coatings will be reviewed to determine if additional coatings/barriers are warranted.

3.3.1 CMU Disposal Per 40 CFR 761.61(b)

Given the project schedule and until EPA approval of this plan, CMU materials removed for off-site disposal will be managed in accordance with 40 CFR 761.61(b). As required by the regulation, these materials will be managed as PCBs ≥ 50 ppm.

Although the characterization data has demonstrated that PCB migration in adjacent CMU is limited to the first block in direct contact with the caulked joint, discussions with the project team and the general contractor have indicated that implementing a "cut-line" and waste segregation approach is not a feasible approach compared to a single waste stream approach due to the level of effort and cost of labor required to segregate the waste. Because the caulking contains PCBs ≥ 50 ppm, any waste generated from CMU block wall removals performed prior to receiving EPA Approval of this plan will be implemented as a 40 CFR 761.61(b) approach, and the caulking and CMU waste will be managed for disposal as PCBs ≥ 50 ppm. This approach will be implemented in the interest of keeping the renovation project moving forward and to meet internal schedule requirements.

3.3.2 CMU Disposal Per 40 CFR 761.61(c)

The initial characterization data provided in Section 2 supports the management of the CMU block waste stream for disposal as PCB waste > 1 and < 50 ppm, including the portions of CMU block located between 0-1 inches from caulked joints. To further support this finding and depending on the Contractor's demolition and work sequencing and schedule, if this option is to be implemented on a specific panel, then prior to demolition, the following characterization samples will be collected from CMU block in former direct contact with the caulking:

- Bulk concrete samples will be collected from the former coated surface at a minimum frequency of one sample per 25 linear feet of caulked joint following the concrete sampling procedures described in Section 2. At each sample location, the existing caulking will be removed and the block manually scraped prior to sample collection. Caulked perimeters of CMU walls scheduled for removal range between approximately 15 and 75 feet, resulting in between 1 and 3 samples to be collected from each wall section; and

- If the results of the samples collected from a particular CMU wall section are reported with PCBs < 50 ppm, then all the CMU block within that wall section will be managed for disposal as PCB waste > 1 ppm and < 50 ppm (see Section 3.7).

3.4 REMEDIAL APPROACH: CAULKING AND WINDOWS SCHEDULED FOR REMOVAL

Certain exterior caulking present at metal window frame to concrete masonry joints has been reported with PCBs ≥ 50 ppm, as discussed in Section 2. At least one type of caulking at each set of windows scheduled for removal and off-site disposal contains PCBs ≥ 50 ppm; as such, all window debris from these windows, including the glass panes, frames, and caulking, will be managed collectively as PCBs ≥ 50 ppm. It is estimated that approximately 275 linear feet of caulking fall into this category.

After establishing site controls as described in Section 3.2, windows and window caulking will be removed collectively from the building by physical means. After the contractor has removed residual caulking from the remaining masonry joint to the maximum extent practical, the remaining masonry (CMU or structural concrete) will be addressed following the same approach for masonry surfaces to remain in place as described in Section 3.5.

3.5 REMEDIAL APPROACH: CAULKING AND BUILDING MATERIALS IN AREAS SCHEDULED TO REMAIN IN PLACE

The renovation project for these areas include surface preparation (via power washing) of the CMU block in preparation of a coating application to the block. No new coatings are proposed, as part of the renovation, for the structural concrete columns and no renovation work is scheduled around windows that are planned to remain in place.

Certain exterior caulking at the building has been reported with PCBs ≥ 50 ppm, as discussed in Section 2. During the renovation project, PCB caulking ≥ 50 ppm that are in removal areas will be managed as described in Sections 3.3 and 3.4. Given the detected concentrations, visually similar caulking that is located in areas not scheduled for demolition/removal will also be removed under the site controls and remediation means and methods described in Section 3.2. This caulking is located between CMU and structural concrete and between metal window frames and CMU or structural concrete. It is estimated that approximately 2,000 linear feet of caulking fall into this category. Caulking around windows on the north elevation and first floor east elevation will not be removed because the caulking was reported at < 1 ppm PCBs (see Section 2).

Following caulking removal, the following activities will be conducted to manage residual PCBs in the building materials.

3.5.1 Inner Concrete Returns of the Joints

After a visual inspection that caulking removal is complete, the following activities will be conducted on the remaining concrete (CMU or structural) in former direct contact with the caulking.

- One masonry sample from an area in former direct contact with the caulking per elevation will be collected for PCB analyses to establish baseline conditions.

- The inner concrete returns of the joints will be encapsulated using two coats of a liquid epoxy, such as Sikagard 62, or equivalent. This coating will ultimately be covered by an installation of a new bead of caulking. After coating curing and prior to new caulking application, wipe samples will be collected in

accordance with 40 CFR 761.123 from coated joints at a frequency of 1 sample per 100 linear feet. Samples will be transported to the laboratory under standard chain of custody procedures, extracted by USEPA Method 3540C (Soxhlet extraction), and analyzed for PCBs by USEPA Method 8082. Analytical results from the verification samples will be evaluated to determine whether or not this task is complete as follows:

- Analytical results ≤ 1 µg/100 cm^2 – task complete; no additional coating required and the joint will be re-caulked.
- Analytical results > 1 µg/100 cm^2 – additional coating of epoxy to be applied, and follow-up verification wipe sample to be collected at an off-set location.

3.5.2 Coated Metal Window Frames

After a visual inspection that caulking removal is complete, the following activities will be conducted on the remaining metal window frames in former direct contact with the caulking.

- Metal window frames will be decontaminated using a solvent or alcohol based cleaner, or equivalent and residual caulking that may be adhered to the frame will be removed. After cleaning, surface wipe samples will be collected from the decontaminated metal frames in accordance with 40 CFR 761.123 at a frequency of 1 sample per 100 linear feet. Samples will be transported to the laboratory under standard chain of custody procedures, extracted by USEPA Method 3540C (Soxhlet extraction), and analyzed for PCBs by USEPA Method 8082. Analytical results from the verification samples will be evaluated to determine whether or not this task is complete as follows:
  - Analytical results ≤ 10 µg/100 cm^2 for first floor windows and ≤ 100 µg/100 cm^2 for second or third floor windows – task complete; no additional cleaning required and the joint will be re-caulked.
  - Analytical results > 10 µg/100 cm^2 for first floor windows and > 100 µg/100 cm^2 for second or third floor windows – additional cleaning to be performed, and follow-up verification wipe sample to be collected at an off-set location.

Of note, none of the glazing sealants between the glass windows and metal frames detected PCBs ≥ 50 ppm and these materials will not be removed given that their removal would require complete removal/disposal of the entire window unit.

3.5.3 CMU Block

CMU block scheduled to remain in place on the building façade is primary located on the 2nd and 3rd floors with only small portions located in isolated areas on the west and south elevations (refer to Figures 2, 3, 4, and 5). As described previously, the low occupancy cleanup level (25 ppm) will be applied to the upper floors and the high occupancy cleanup level (1 ppm) will be applied to the first floor. The characterization data has shown that concrete samples of the CMU block (within one inch of caulked joints) does not contain PCBs above 25 ppm. However, concrete samples within 8 inches of the caulked joint have detected PCBs above 1 ppm.

Based on this data, no additional activities will be conducted on the remaining CMU block on the 2nd and 3rd floors (> 10 feet above grade). It should be noted that these materials will ultimately be covered with a liquid coating (concrete paint) as part of the planned renovation activities for the building. In the two isolated areas on the 1st floor, an encapsulating barrier (two coats of a protective acrylic coating such as Sikagard 670W, or equivalent) will be applied in areas over 1 ppm. In these areas (within 8 inches of the joint), the block will be manually cleaned with brushes if

required for surface preparation of the block prior to coating. If this activity is conducted, all water will be collected, tested, and disposed at an appropriate facility based on its tested concentration.

After applying the coating, surface wipe samples will be collected in accordance with 40 CFR 761.123 at a frequency of 1 sample per 100 linear feet. Samples will be transported to the laboratory under standard chain of custody procedures, extracted by USEPA Method 3540C (Soxhlet extraction), and analyzed for PCBs by USEPA Method 8082. Analytical results from the verification samples will be evaluated to determine whether or not this task is complete as follows:

- Analytical results ≤ 1 µg/100 cm^2 – task complete; no additional coating required.
- Analytical results > 1 µg/100 cm^2 – additional coating may be applied depending on the concentrations; and follow-up verification wipe sample to be collected at an off-set location.

As indicated above, the remaining CMU block is planned to be painted as part of the building renovation activities. To prepare the concrete facade for surface coating, the surface of the CMU block is planned to be power washed. As described in Section 2 and above, the extent of PCB impacts > 1 ppm away from the caulked joints within CMU is limited to within 8 inches of the joint. Power washing is not planned to be conducted until the caulking has been removed, the inner return of the joint encapsulated, new caulking applied, and the liquid coating applied to the adjacent material (first floor CMU located at a lateral distance of 8 inches from a former caulked joint will be managed in place by a liquid coating application).

Given these activities, the source of the PCBs will have been removed prior to power washing and any residual PCBs located on the masonry will be isolated from the remaining non-impacted CMU through liquid coatings. Given that the power washing will be conducted only in non-PCB impacted areas, it is not planned to collect any of the water generated during these activities. Any storm drains or other drainage areas will be blocked or contained so that any water travelling done the side of the building will remain on the ground surface adjacent to the building.

As noted above, all remaining CMU will ultimately be covered with a liquid coating/paint as part of the planned renovation activities for the building.

3.5.4 Structural Concrete

There are no current renovations plans to apply a coating to the structural concrete; therefore power washing activities will not take place.

Structural concrete columns scheduled to remain in place on the building façade are located on the 2nd and 3rd floors; however, there are areas also located on the first floor (refer to Figures 2, 3, 4, and 5). As described previously, the low occupancy cleanup level (25 ppm) will be applied to the upper floors and the high occupancy cleanup level (1 ppm) will be applied to the first floor. The characterization data has shown that concrete samples of the structural concrete (within one inch of caulked joints) does not contain PCBs above 25 ppm. However, concrete samples within 3.5 inches of the caulked joint have detected PCBs above 1 ppm.

Based on this data, no additional activities will be conducted on the structural concrete on the 2nd and 3rd floors (> 10 feet above grade). On the areas on the 1st floor, an encapsulating barrier will be applied in areas over 1 ppm, which includes concrete located at a lateral distance of 3.5 inches (minimum) from a former ≥50 ppm caulked joint. This material will be managed in place by coating the surface with two coats of a protective acrylic clear coating such as

Sikagard 670W, or equivalent. It should be noted that this lateral distance may be expanded based on aesthetics and final review of building conditions.

After applying the coating, surface wipe samples will be collected in accordance with 40 CFR 761.123 at a frequency of 1 sample per 100 linear feet. Samples will be transported to the laboratory under standard chain of custody procedures, extracted by USEPA Method 3540C (Soxhlet extraction), and analyzed for PCBs by USEPA Method 8082. Analytical results from the verification samples will be evaluated to determine whether or not this task is complete as follows:

- Analytical results ≤ 1 µg/100 cm^2 – task complete; no additional coating required.
- Analytical results > 1 µg/100 cm^2 – additional coating to be applied, and follow-up verification wipe sample to be collected at an off-set location.

3.6 GROUND SURFACE COVERINGS AND SOIL

As part of the site renovation activities, subsurface soils are scheduled for removal in front of the south, east, and west façade elevations. Prior to beginning this phase of work, characterization samples will be collected in accordance with Subpart N requirements or an alternate sampling approach approved by EPA. If the materials are found to contain PCBs above cleanup levels, a modification to this plan will be developed for submittal to EPA at that time.

3.7 STORAGE AND DISPOSAL

The following activities will be completed with regard to the proper storage and disposal of PCB wastes:

- Secure, lined, and covered waste containers (cubic yard boxes, roll-offs, or equivalent) or 55-gallon DOT-approved steel containers will be staged for the collection of PCB wastes generated during the work activities in accordance with 40 CFR 761.65;
- PCB waste containers will be properly labeled and marked in accordance with 40 CFR 761.40 and the Massachusetts Hazardous Waste Requirements at 310 CMR 30.000;
- At the end of each work day, any generated PCB wastes will be removed from the work area and placed into the appropriate waste containers;
- Caulking containing PCBs ≥ 50 ppm and certain building materials coated or in direct contact with this caulking (concrete, glass window panes, and metal window or door frames), or materials otherwise managed as PCB waste ≥ 50 ppm under 40 CFR 761.61(b), will be transported off-site for disposal as ≥ 50 ppm PCB wastes. The waste will be transported to a hazardous waste landfill permitted to accept this type of waste (e.g., Chemical Waste Management's landfill in Model City, NY, or equivalent facility).
- Caulking and certain building materials containing PCBs > 1 and < 50 ppm will be transported off-site for disposal as PCB remediation waste in accordance with 40 CFR 761.61. The waste will be transported to a non-hazardous waste landfill permitted to accept such materials (e.g., Waste Management's Turnkey Recycling and Environmental Enterprises facility in Rochester, New Hampshire or equivalent facility).
- At the end of their use on the project, non-disposable tools and equipment will be decontaminated in accordance with 40 CFR 761.79. Decontamination fluids generated during the work will be collected/contained and managed/disposed in accordance with 40 CFR 761.79.

- Copies of waste manifests, waste shipment records, and certificates of disposal will be collected and provided as part of the final report to EPA and MassDEP.

3.8 RECORDKEEPING AND DOCUMENTATION

Following completion of the work activities, records and documents per 40 CFR Part 761 will be generated and maintained at one location. These documents will be made available to EPA and MassDEP upon request. A final report documenting the completion of the work activities and including but not limited to a description of the work activities, verification analytical results, volumes of disposed materials, and waste disposal documentation will be prepared and submitted to EPA and MassDEP.

4. CONCEPTUAL MONITORING AND MAINTENANCE PLAN

As described in this plan, some building materials are proposed to be managed in place in accordance with 40 CFR 761.61(c). This approach removes source materials and utilizes a physical barrier approach (i.e., a liquid coating) to eliminate the direct contact exposure potential and migration pathways of PCBs remaining on the building. Upon completion of the remedial actions, the impacted materials would not be accessible to direct exposure or migration to surrounding building materials.

Following the completion of the remediation activities described herein, a monitoring and maintenance plan (MMP) will be developed and implemented. The main components of the plan are as follows:

- Visual inspections – visual inspections of the encapsulated surfaces will be conducted. The inspections will be recorded and included in a report to the EPA. The inspections will consist of an assessment of the following:
    - Signs of the underlying coating, or excessive pitting, peeling, or breakages in the coating, if visible;
    - Signs of weathering or disturbance of the replacement caulking (where applied); and,
    - A general inspection of the encapsulated surfaces.
- Monitoring – surface wipe samples will be collected from the encapsulated surfaces at frequency described in the MMP (to be based on the verification and baseline wipe samples). Wipe samples will be collected following the standard wipe test procedures described in 40 CFR 761.123 or by an alternate approved method.
- Corrective Actions – if results of the inspections or monitoring indicate that corrective measures (coating replacements) are needed, the measures will be conducted;
- Maintenance Guidelines and Procedures – to prevent potential exposure to maintenance and facility personnel that may perform activities in the encapsulated areas, guidelines and procedures will be developed and implemented for any work being conducted in the respective encapsulated areas. These guidelines and procedures will detail communication procedures, worker protection requirements, and worker training requirements to be conducted for maintenance or other activities in these areas;
- Reporting – a report documenting the findings of the visual inspections will be prepared and submitted to EPA.

The details of the MMP will be developed following completion of the remedial activities described above. The results of the inspections and verification testing will be used to develop the details of the plan. The MMP will be provided to EPA under a separate submittal following the completion of the remedial activities.

5. SCHEDULE

At this time, the building renovation work is currently underway and on a fast-track completion schedule. Exterior caulking with PCBs ≥ 50 ppm was recently detected (February 2011) and the project team has been collecting data and developing this Remediation Plan. However, work is continuing and where this work encounters caulking ≥ 50 ppm, this material as well as any PCB impacted material generated in this work area, is being managed for disposal as a ≥ 50 ppm waste under 40 CFR 761.61(b).

In general, building material removal work is scheduled to progress in a counter-clockwise direction around the building beginning with the east façade elevation. After the PCB remediation component of each area has been completed by the Remediation Contractor and verified by the methods described in this Plan, the area will be cleared for remaining work by the General Contractor, subject to the restrictions for PCB-containing materials being managed in place in accordance with 40 CFR 761.61(c).

Table 2-1
Caulking Analytical Data Summary
125 Western Ave - Boston, MA

Type	Location Description	Interior / Exterior	Sample Date	Sealant Description	Adjacent Materials in Contact	Sample ID	Total PCBs (mg/kg)
SOUTH FAÇADE ELEVATION (Western Ave Side)							
V	1st floor vent to mechanical room	Exterior	02/25/11	Caulk, Light Gray, soft, cracking	Metal Frame and Concrete	125-CBK-016	< 0.360
Y	Caulking at Exterior Concrete Joints between columns and CMU / concrete; 2nd and 3rd floors	Exterior	02/28/11	Caulk, 1/4",Gray, flexible, cracked	CMU and Concrete	125-CBK-038	**1,070**
I	2nd, 3rd Floor Windows	Exterior	02/28/11	Caulk, 3/4" Gray/Dark Gray, cracked, flexible	Metal Frame and Concrete	125-CBK-039	**1,470**
		Interior	02/28/11	3/4" grey, soft. Flexible	Glass and frame	125-CBK-037	9.27
		Exterior	02/18/11	Caulk, tannish/gray, soft, flexible	Glass to Concrete	1102226-002	1.74
U	Front Lobby Entrance (Western Avenue)	Interior	02/25/11	Glazing, Black	Glass and Metal Frame	125-CBK-017	32.4
		Exterior	02/28/11	Caulk, light grey, plastic, flexible, cracking	Metal Frame and Concrete	125-CBK-032	**2,630 J**
		Exterior	02/25/11	Caulk, Gray, thick to thin	Metal frame to concrete	125-CBK-022	**269**
		Interior	02/28/11	Glazing, < 1/8", white, brittle, crumbles easy. Painted black	Metal Frame and glass	125-CBK-036	14.4 J
T		Interior	02/25/11	Caulk, White (Painted Black), soft, pliable	Metal Frame and Concrete	125-CBK-018	**8,600**
S		Interior	02/25/11	Caulk, Gray, soft, pliable	Metal Frame and Concrete	125-CBK-023	**110,000**
Z	1st Floor Windows	Exterior	02/25/11	Glazing sealant, Brown, soft	Glass and Metal Frame	125-CBK-019	0.716
Q		Interior	02/25/11	Glazing sealant, Black	Glass and Metal Frame	125-CBK-024	2.48 J
		Exterior	02/25/11	Caulking	Metal Frame and Concrete	125-CBK-020	**19,300**
	Concrete overhang	Exterior	02/25/11	Caulk, White, thin, stiff/brittle	Concrete/metal	125-CBK-021	1.90
	Concrete pads/curb	Exterior	02/28/11	Grey flexible, plastic, grey on outer portions, brown inside.	Concrete/Concrete	125-CBK-034	**1,860**
EAST FAÇADE ELEVATION (Business School Parking Lot Side)							
Y	Caulking at Exterior Concrete Joints between columns and CMU/concrete	Exterior	02/28/11	Outer - dark grey, flexible, no cracking; Inner-light grey/blue, flexible, sticky, cracking	CMU and Concrete	125-CBK-026	**3,600**
	2nd, 3rd Floor Fire Stairway Exit Doors	Exterior	02/28/11	Bronze, highly flexible, no cracking, soft.	Metal Frame and Concrete	125-CBK-025	3.72
NORTH FAÇADE ELEVATION (Back of Building)							
A	1st, 2nd, 3rd Floors NW Windows	Exterior	02/18/11	Caulk, Light Gray, brittle	Metal Frame and Concrete	1102226-001	0.878
Y	Caulking at Exterior Concrete Joints between columns and CMU/concrete	Exterior	02/18/11	Caulk, White/Light Gray	Concrete and Concrete	1102226-003	**1,060**
WEST FAÇADE ELEVATION (Contractor Parking Lot Side)							
Y	Caulking at Exterior Concrete Joints between columns and CMU/concrete	Exterior	02/28/11	Outer - dark grey, flexible, no cracking; Inner-light grey/blue, flexible, sticky, cracking	Concrete	125-CBK-028	**1,570**
	3rd Floor Windows Above Loading Dock	Exterior	02/28/11	Caulk, bronze, stiff, hard, cracked	Metal frame and concrete	125-CBK-040	2.24
F		Interior	02/28/11	Caulk, 1/4", Black, flexible, soft, pliable	Metal Frame and Wood Shelf	125-CBK-030	1.41 J
G		Interior	02/28/11	Caulk, 1/2-3/4", bronze, soft, flexible	Metal frame and concrete	125-CBK-031	**53.8**

Notes:
1. Samples collected by Woodard & Curran on February 25 and February 28, 2011 were sent to Analytics Environmental Laboratory of Portsmouth, NH for Soxhlet extraction (3540C) and analyzed for PCBs by EPA Method 8082.
2. J = Value is qualified as estimated based on data validation.
3. < = Value is less than laboratory's minimum reporting limit, as indicated.
4. Samples classified as "interior" caulking or sealants were located on the interior side of an exterior feature (i.e., the inside of a window or door constructed within an exterior wall).

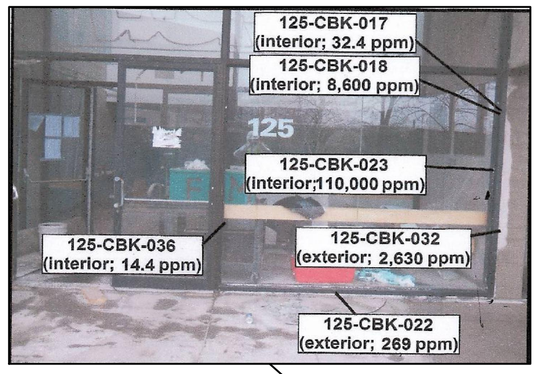
Table 2-2
Adjacent Concrete Analytical Data Summary
125 Western Ave - Boston, MA

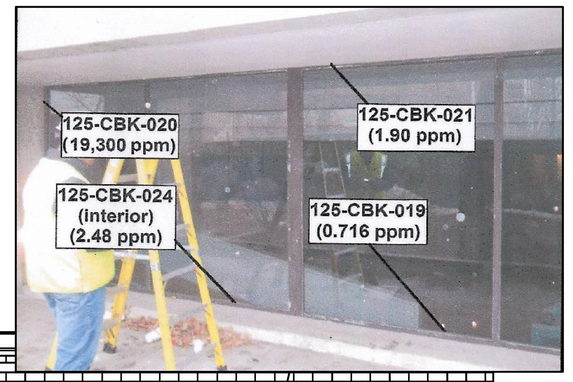
Façade	Sample Location	Joint Orientation	Joint Type	Sample Date	Sample ID	Total PCBs (mg/kg)	Qualifier	Distance from Joint	Other Descriptor
Concrete Masonry Unit (CMU) Block Samples - Representative Locations									
South	Above	Horizontal	CMU:concrete	03/17/11	125-CBC-094	0.23		8-9 inches	One block above joint
East	Above	Horizontal	CMU:concrete	03/14/11	125-CBC-076	8.65		0-1 inches	Immediately above joint
South	Below	Horizontal	CMU:concrete	03/11/11	125-CBC-051	0.406		8-9 inches	One block below joint
				03/11/11	125-CBC-050	0.293		16-17 inches	Two blocks below joint
East	Below	Horizontal	CMU:concrete	03/10/11	125-CBC-046	<0.033		8-9 inches	One block below joint
				03/10/11	125-CBC-047	<0.033		16-17 inches	Two blocks below joint
West	Below	Horizontal	CMU:concrete	03/14/11	125-CBC-059	0.186		9-10 inches	One block below joint
				03/11/11	125-CBC-054	<0.04		17-18 inches	Two blocks below joint
East	Lateral	Vertical	CMU:concrete	03/14/11	125-CBC-066	0.215		16.5 inches	First accesible half block
				03/14/11	125-CBC-065	<0.033		24 inches	First accessible full block
West	Lateral	Vertical	CMU:concrete	03/11/11	125-CBC-056	0.100		5-6 inches	First accessible half block after recess
				03/11/11	125-CBC-055	<0.033		11.5-12.5 inches	First accessible full block after recess
South	Lateral	Vertical	CMU:concrete	03/14/11	125 CBC-070	7.64		0-1 inches from CMU:concrete joint	Prison window edge in 6-inch CMU width; sample adj to CMU:structural joint
South	Lateral	Vertical	CMU:metal	03/14/11	125-CBC-069	4.68		0-1 inches from CMU:metal joint	Prison window edge in 6-inch CMU width; sample adj to CMU:metal joint
South	Lateral	Vertical	CMU:metal	03/14/11	125-CBC-074	6.74		0-1 inches	Between prison windows, before 90-degree corner
				03/11/11	125-CBC-052	0.41		6.5 inches from corner	Between prison windows, after 90-degree corner
Concrete Masonry Unit (CMU) Block Samples - 5-foot Sampling Grid									
East	Samples collected within the perimeter of the CMU block wall beneath structural concrete spandrels and beside structural concrete columns		CMU:concrete	03/17/11	125-CBC-078	< 0.095		8-9 inches	Samples collected from the first CMU block beyond one in direct contact with a caulked joint. CMU block height is 8 inches; CMU block width is 16 inches, where the nearest non-direct contact CMU block is half a block away (8 inches) from any vertical caulked joint.
East			CMU:concrete	03/17/11	125-CBC-079	< 0.100			
East			CMU:concrete	03/17/11	125-CBC-080	< 0.100			
East			CMU:concrete	03/17/11	125-CBC-081	< 0.100			
East			CMU:concrete	03/17/11	125-CBC-082	< 0.091			
East			CMU:concrete	03/17/11	125-CBC-083	< 0.095			
East			CMU:concrete	03/17/11	125-CBC-084	< 0.095			
East			CMU:concrete	03/17/11	125-CBC-085	< 0.095			
East			CMU:concrete	03/17/11	125-CBC-086	< 0.100			
East			CMU:concrete	03/17/11	125-CBC-087	< 0.095			
East			CMU:concrete	03/17/11	125-CBC-088	< 0.095			
East			CMU:concrete	03/17/11	125-CBC-089	< 0.091			
East			CMU:concrete	03/17/11	125-CBC-090	< 0.095			
East			CMU:concrete	03/17/11	125-CBC-091	< 0.095			
East			CMU:concrete	03/17/11	125-CBC-092	< 0.095			
East			CMU:concrete	03/17/11	125-CBC-093	< 0.100			

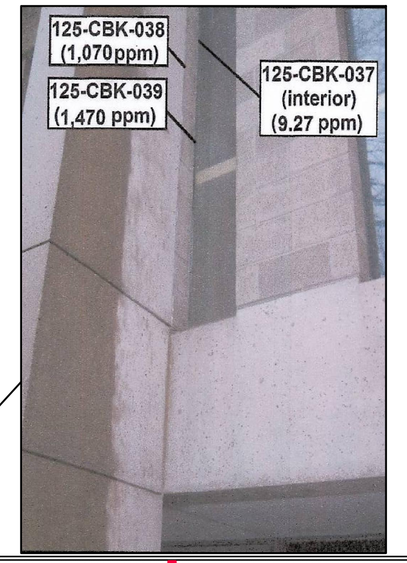
Table 2-2
Adjacent Concrete Analytical Data Summary
125 Western Ave - Boston, MA

Façade	Sample Location	Joint Orientation	Joint Type	Sample Date	Sample ID	Total PCBs (mg/kg)	Qualifier	Distance from Joint	Other Descriptor
Structural Concrete Samples - Representative Locations									
East	Above	Horizontal	CMU:concrete	03/11/11	125-CBC-057	0.281	J	0-1 inches	Underside of spandrel overhang
				03/11/11	125-CBC-058	<0.033		3.5-4 inches	Front face of spandrel, 0.5-1" from corner
West	Above	Horizontal	CMU:concrete	03/14/11	125-CBC-061	3.21		0-1 inches	Underside of spandrel overhang
				03/14/11	125-CBC-062	0.385	J	3.5-4 inches	Front face of spandrel, 0.5-1" from corner
East	Below	Horizontal	CMU:concrete	03/14/11	125-CBC-077	1.47	J	0-1 inches	Immediately below joint
South	Below	Horizontal	Structural:metal	03/11/11	125-CBC-048	12.2		0-1 inches	Window ledge; horizontal surface
				03/11/11	125-CBC-049	0.741		5-6 inches	Window ledge; horizontal surface
South	Below	Horizontal	Structural:metal	03/14/11	125-CBC-073	0.319		0-1 inches	Window ledge; horizontal surface
West	Lateral	Vertical	CMU:concrete	03/14/11	125-CBC-063	<0.033		4-5 inches	Before 90º corner; 2nd floor; south face of column
				03/14/11	125-CBC-064	<0.033		6.5-7.5 inches	Beyond 90º corner; 2nd floor; west face of column
South	Lateral	Vertical	CMU:concrete	03/14/11	125-CBC-071	2.49	J	0-1 inches	East face of column; 5 inches above spandrel
				03/14/11	125-CBC-072	<0.033		5-6 inches	East face of column 5; 5 inches above spandrel
East	Lateral	Vertical	CMU:concrete	03/14/11	125-CBC-067	0.098		4-5 inches	Before 90º corner; 2nd floor; south face of column
				03/14/11	125-CBC-068	0.113		6.5-7.5 inches	Beyond 90º corner; 2nd floor; east face of column
South	Lateral	Vertical	Structural:metal	03/10/11	125-CBC-044	1.94		0-1 inches	Vertical face beside ground floor windows
				03/10/11	125-CBC-045	0.084	J	5-6 inches	Vertical face beside ground floor windows

Notes:
1. Samples were prepared by Soxhlet extraction (3540C) and analyzed for PCBs by EPA Method 8082.
2. J = Value is qualified as estimated based on data validation.
3. < = Value is less than laboratory's minimum reporting limit, as indicated.



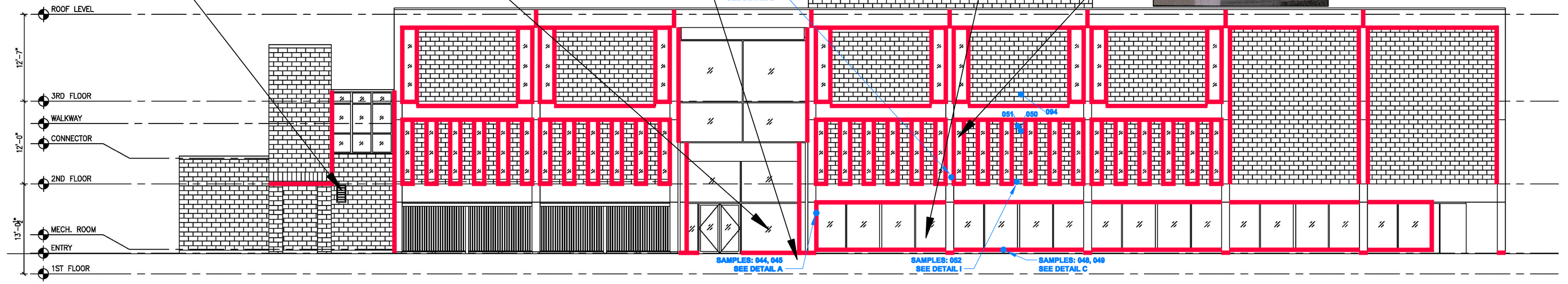


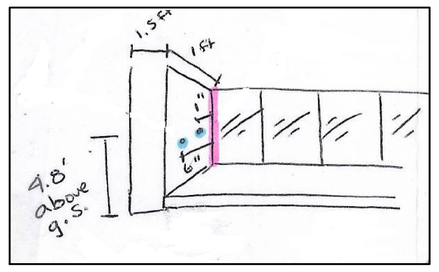


LEGEND

PCB ≥ 50 PPM CAULKING

PROPOSED DEMOLITION AREA





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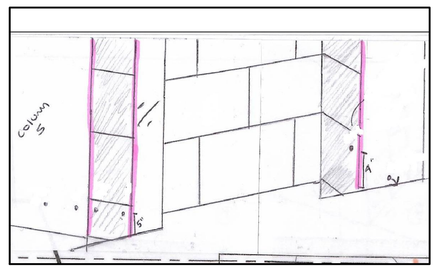

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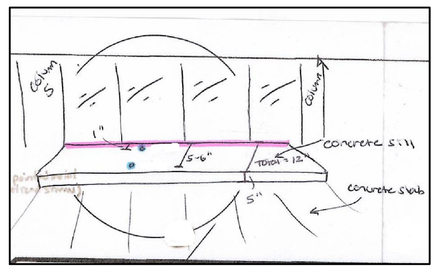

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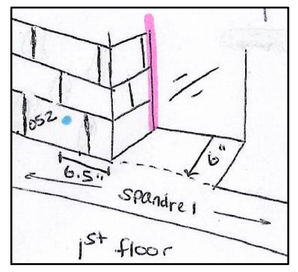

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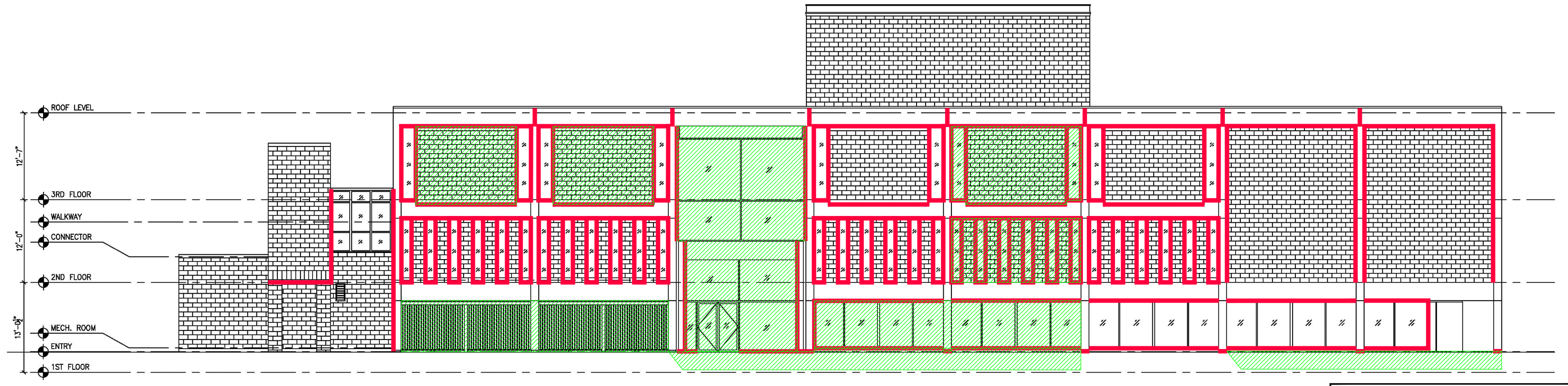

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COMMITMENT & INTEGRITY DRIVE RESULTS

WOODARD & CURRAN

REV	DESCRIPTION	DATE
DESIGNED BY:	CHECKED BY:	
DRAWN BY: EJR	Copy of Figure 2.dwg	

SOUTH FACADE ELEVATION

125 WESTERN AVENUE

PCB REMEDIATION PLAN

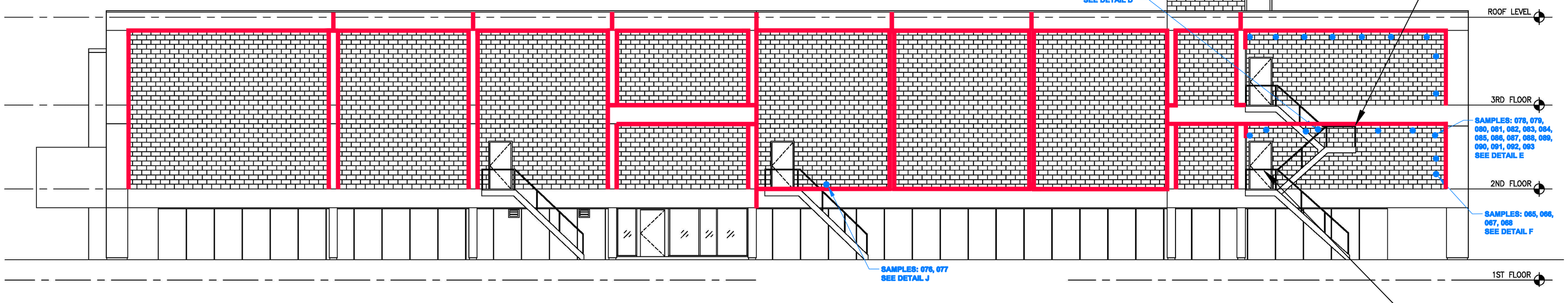
JOB NO.: 223947
DATE: MARCH2011
SCALE: N.T.S
SHEET: OF

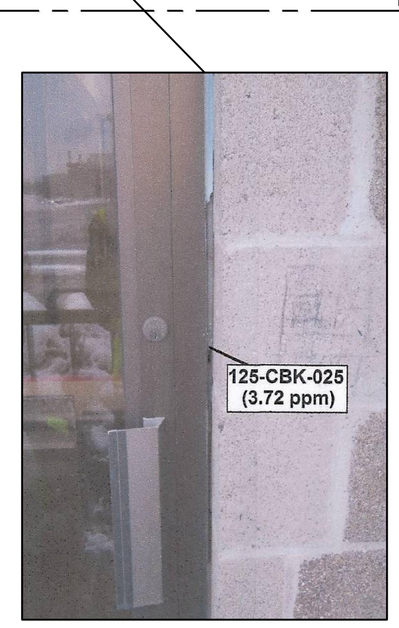
FIGURE 2

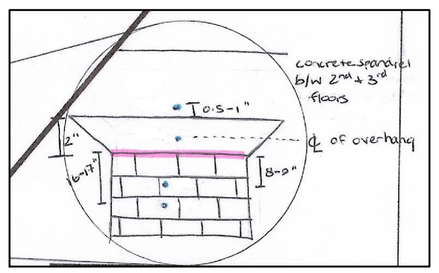
LEGEND

PCB ≥ 50 PPM CAULKING

PROPOSED DEMOLITION AREA







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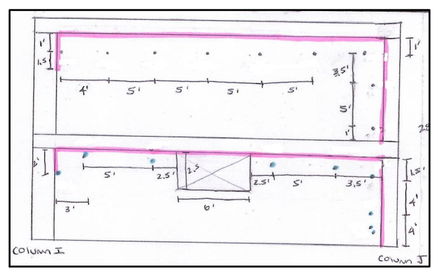

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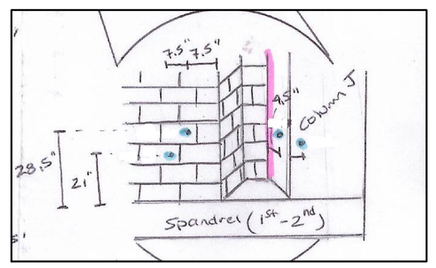

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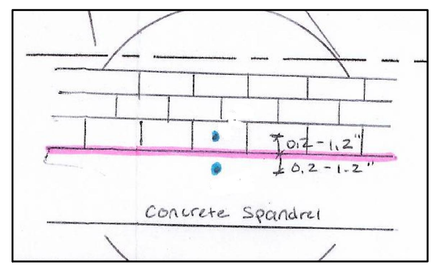

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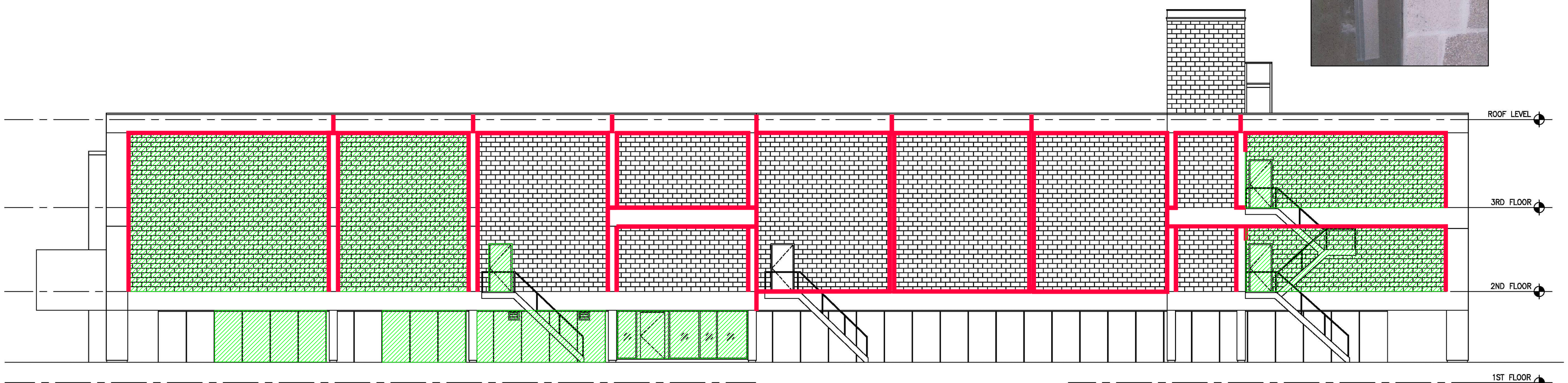

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	DRAWN BY: EJR	Copy of Figure 3.dwg

EAST FACADE ELEVATION

125 WESTERN AVENUE

PCB REMEDIATION PLAN

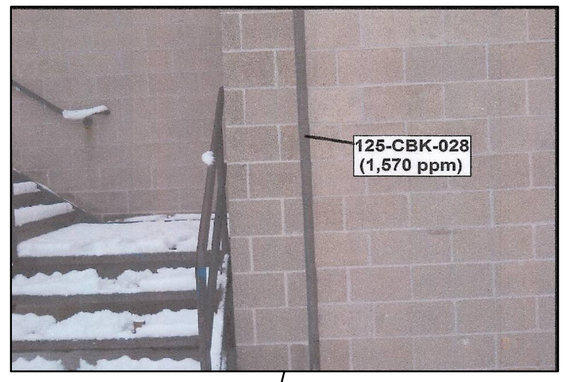
JOB NO.: 223947
DATE: MARCH2011
SCALE: N.T.S
SHEET: OF

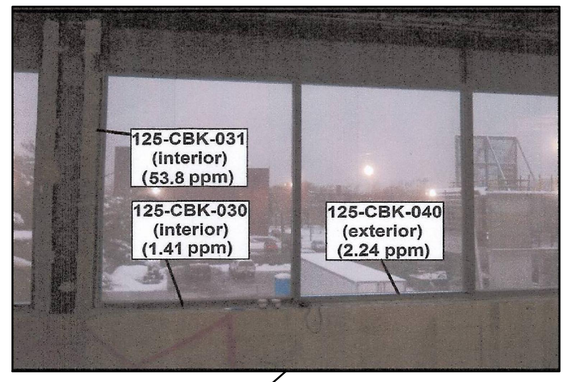
FIGURE 3

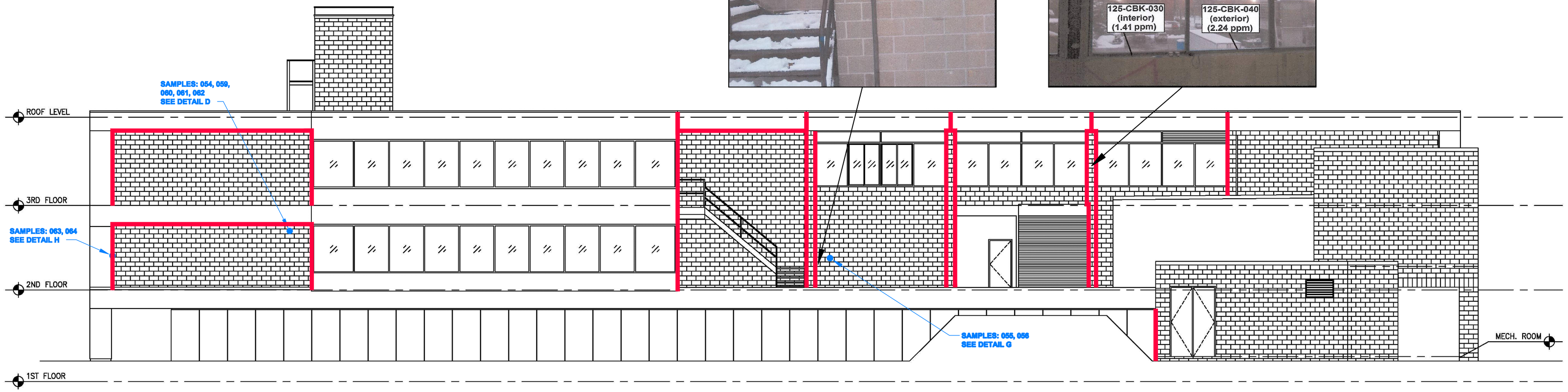
LEGEND

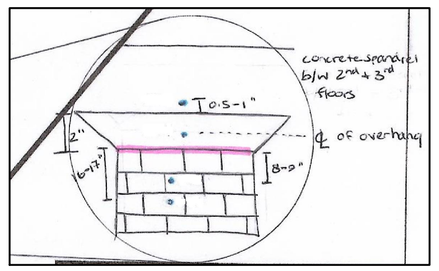
PCB ≥ 50 PPM CAULKING

PROPOSED DEMOLITION AREA









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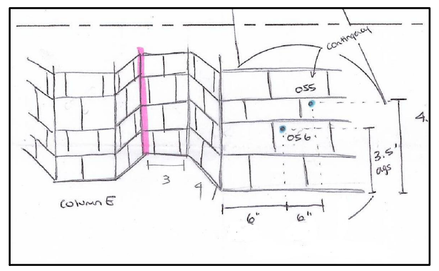

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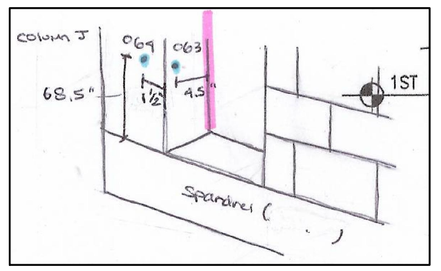

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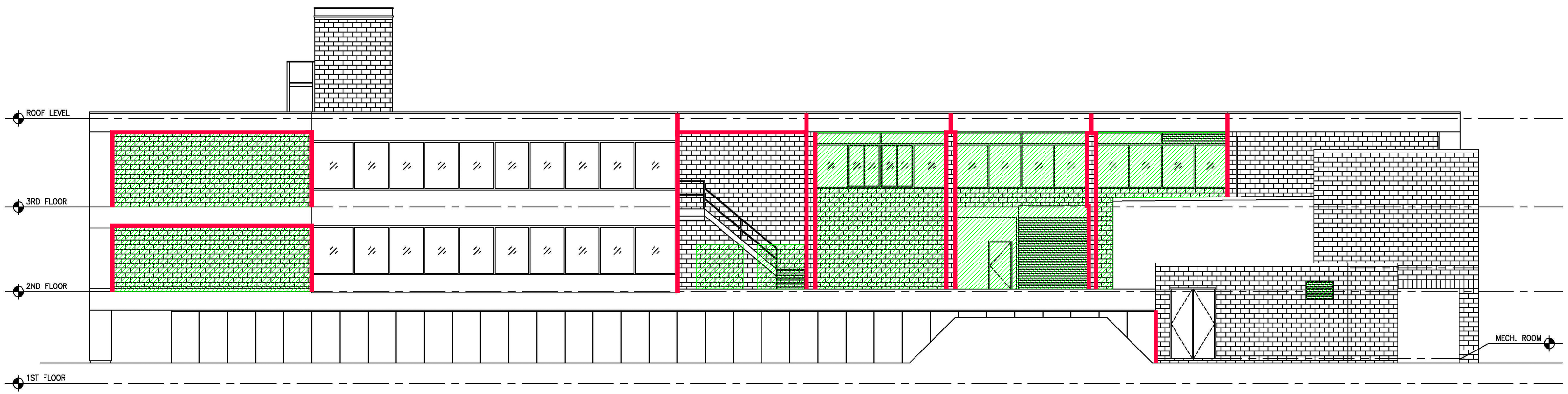

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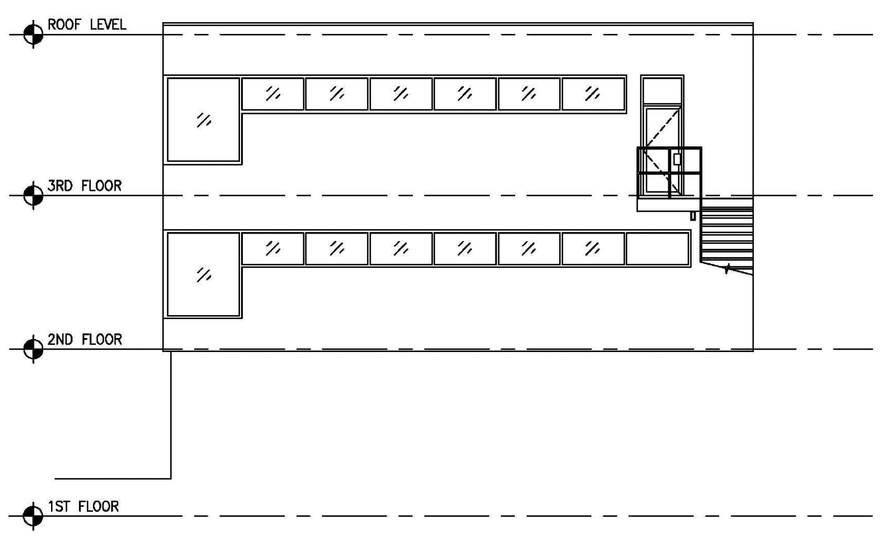
WEST FACADE ELEVATION

125 WESTERN AVENUE

PCB REMEDIATION PLAN

JOB NO.: 223947
DATE: MARCH2011
SCALE: N.T.S
SHEET: OF

FIGURE 4



LEGEND

PCB ≥ 50 PPM CAULKING

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COMMITMENT & INTEGRITY DRIVE RESULTS

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NORTH AND PARTIAL WEST FACADE ELEVATIONS

125 WESTERN AVENUE

PCB REMEDIATION PLAN

JOB NO.: 223947
DATE: MARCH2011
SCALE: N.T.S
SHEET: OF

FIGURE 5

APPENDIX A: WRITTEN CERTIFICATION

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Certification

The undersigned owner of the property where the cleanup site is located and the party conducting the cleanup certify that all sampling plans, sample collection procedures, sample preparation procedures, extraction procedures and instrumental/chemical analysis procedures used to assess or characterize the PCB contamination at the cleanup site, are on file at the location indicated below and are available for EPA inspection, as set forth below.

Document Location

Harvard University
Department of Environmental Health & Safety
46 Blackstone Street
Cambridge, MA 02139

Property Owner and Party Conducting the Cleanup

Thomas J Martin — 3/31/11

Authorized Signature — Date

THOMAS J. MARTIN

Name of Authorized Representative (Print)

DIRECTOR OF DESIGN + CONSTRUCTION

Title

APPENDIX B: LABORATORY ANALYTICAL DATA

APPENDIX C: PERIMETER AIR MONITORING PLAN

Airborne particulate matter (PM) consists of many different substances suspended in air in the form of particles (solids or liquid droplets) that vary widely in size. Inhalation hazards are caused if the intake of these particles includes intake of vapors and/or contaminated dust. Particles less than 10 micrometers in diameter (PM-10), which include both respirable fine (less than 2.5 micrometers) and coarse (less than 10 micrometers) dust particles, pose the greatest potential health concern because they can pass through the nose and throat and get into the lungs.

During the performance of the planned remediation activities, particulate matter in the form of potentially PCB-affected dust may be generated. The greatest potential for the generation of affected dust is during the removal of concrete, excavation of soils, and during placement of these materials into containers for off-site disposal.

As indicated in the remediation plan, the main dust control mechanism to be employed on the project will be the use of engineering controls (e.g. work zone enclosures, using hand tools as opposed to grinding away caulking) and personal protective equipment (PPE). In addition, particulate air monitoring will be conducted during potential dust-generating activities in the Support Work Zone (SWZ) and perimeter to the SWZ. The SWZ is the area just outside of the active work areas, in designated safe work zones or support zones. Particulate air monitoring will determine if fugitive dust particles are present in the ambient air within the designated SWZ and/or perimeter during active removal activities. A direct-reading particulate meter will be used to monitor airborne particulate concentrations during site activities. Particulate concentrations shall be utilized as an indirect indicator of exposures to on-site receptors.

Dust concentrations in the SWZ will be measured using a suitable real time aerosol particulate monitor capable of determining ambient air fugitive dust concentrations to 0.001 milligrams per cubic meter (mg/m^3). Air monitoring shall be conducted while active concrete removal activities are occurring and at a frequency of one reading per hour of activities. Air monitoring equipment will be operated by the Site safety officer or by a competent representative under the direction of the Site safety officer. Prior to the active removal actions and at periodic points during the project, air monitoring readings will be recorded to document background particulate matter concentrations. All readings will be recorded on the air monitoring log sheet; example attached.

If visible dust is observed or if total particulate concentrations in the SWZ exceed the action limits (as specified below and incorporating background readings) and are sustained (i.e. greater than 5 minutes), then a temporary work stoppage to employ additional dust suppression techniques to mitigate fugitive dust shall be initiated. If applicable, the dust suppression techniques shall involve the application of a fine mist of water over the area creating the fugitive dust condition. The water shall be applied either by small hand held sprayers, sprinklers, or hose nozzles. The water source for dust suppression activities will be from the building's water supply. In the event that the total of airborne particulate cannot be maintained below the action limit in the SWZ, then work activities shall be ceased until sustained readings are below the action limit or the SWZ designation is re-evaluated.

OSHA has published the following permissible exposure limits (8 hour time weighted average) for air contaminants (29 CFR 1910.1000):

Air Contaminant	PEL (8-hour TWA)
Total Dust	15 mg/m^3
Respirable Dust Fraction	5 mg/m^3
PCBs (42% Chlorine)	1 mg/m^3
PCBs (54% Chlorine)	0.5 mg/m^3

In addition, EPA has established a National Ambient Air Quality Standard for PM-10 of 0.150 mg/m^3 (24-hr average).

A total airborne particulate action limit has been established for the remediation work to be conducted at 125 Western Avenue with consideration of the specific receptors, PCB concentrations, work activities, and OSHA permissible exposure limits. The action limit applies only to air monitoring within the SWZ and perimeter to the SWZ; an action limit has not been set for the active work zones (exclusion zones) as engineering controls will be used within these zones.

Given the anticipated PCB concentration in dust that may be generated during abatement activities, a conservative action limit of 0.1 mg/m^3 above background will be maintained during site work. Air monitoring at a location representative of background air conditions (i.e. a location upwind of the work area) will be conducted at the same frequency as SWZ monitoring to obtain data representative of real-time background conditions. The action limit will be used to determine if and when additional engineered controls and/or work stoppages would be necessary.

Air monitoring equipment will be calibrated according to manufacturer's specifications. Weather and other site conditions will affect the normal operation of the equipment, which will require routine maintenance. Weather conditions will be noted on daily air monitoring logs. It is expected that dust or other particulate matter will not be a concern on rainy or misty days.

AIR MONITORING LOG SHEET
125 WESTERN AVENUE REMEDIATION PROJECT

Monitoring Location: ______________________________ **Page ____ of ____**

Date	Time	Dust Level mg/m^3	Temperature ^oF	Weather Conditions	Current Site Activity	NOTES